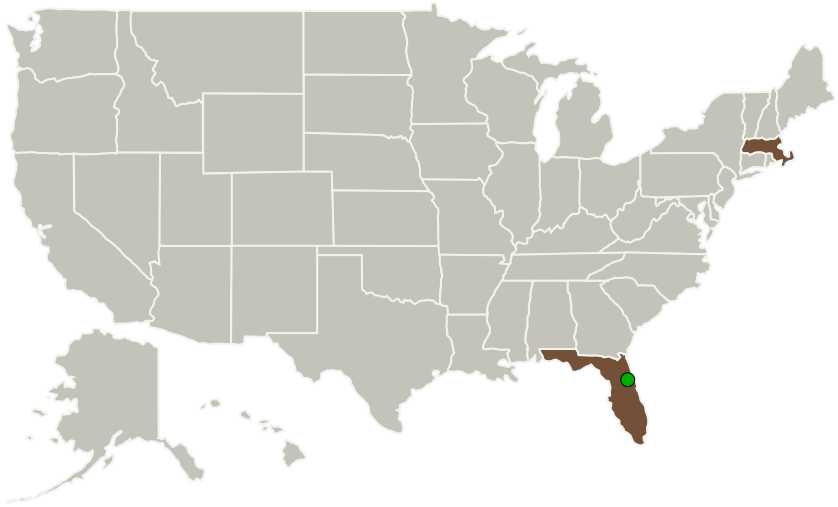
Hybrid Aerogel-MLI Insulation System for Cryogenic Storage in Space Applications, Phase I

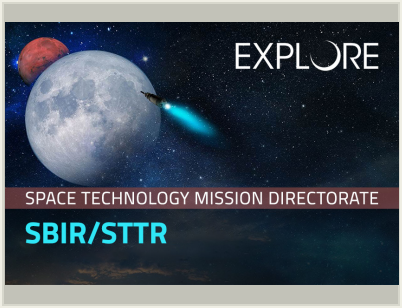
Completed Technology Project (2010 - 2010)

Project Introduction

The future of the NASA space program includes longer and more invasive missions into space, with a goal to return to the moon's surface by the year 2015. Long duration storage of large quantities of cryogenic fluids for propulsion, power, and life-support is an essential requirement for these missions. The behavior of active and passive cryogenic management is paramount to the thermal status of a spaceship and cryotanks storage. Efficient and reliable insulation materials are key to the success of long missions into space. Aspen Aerogels proposes to develop a durable and cost effective hybrid aerogel/MLI insulation system for cryogenic storage in space applications. The proposed hybrid insulation system will withstand micrometeoroids impacts and will outperform the MLI in cases of vacuum loss. During the Phase II Program, extensive work will be dedicated to the developing a system level solution for installation of the flexible hybrid insulation system onto cryotank surfaces to minimize seams, and thermal leaks. Development of the proposed novel cost effective insulation package will provide NASA with a long-term cryogenic propellant storage thermal control solution for applications in low earth orbit (LEO), and on the lunar surface.

Primary U.S. Work Locations and Key Partners





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Organizations Performing Work	Role	Type	Location
Aspen Aerogels, Inc.	Lead Organization	Industry	Northborough, Massachusetts
Kennedy Space Center(KSC)	Supporting Organization	NASA Center	Kennedy Space Center, Florida

Primary U.S. Work Locations	
Florida	Massachusetts

Project Transitions

January 2010: Project Start

July 2010: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/140118)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Aspen Aerogels, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

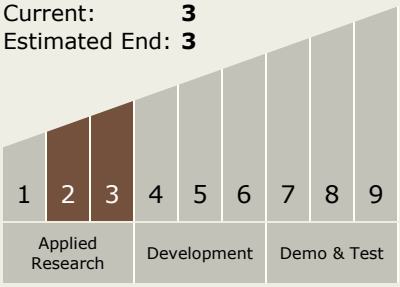
Carlos Torrez

Principal Investigator:

Redouane Begag

Technology Maturity (TRL)

Start: **2**
Current: **3**
Estimated End: **3**



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Technology Areas

Primary:

- TX01 Propulsion Systems
  - TX01.2 Electric Space Propulsion
    - TX01.2.1 Integrated Systems and Ancillary Technologies

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System